

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/12/09 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 3/12/09 has been considered by the examiner.

Specification

3. The amendment to the specification (3/12/09) is acceptable and has been entered.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with inventor Urbain Alfred von der Embse on 4/24/09.

The application has been amended as follows:

In the claims (received on 3/12/09):

- Claim 1, line 32, insert --- implemented --- prior to "with";
line 33, delete phrase --- channelization --- ;
page 2, line 5, insert --- implementation of --- after "simultaneous"
- Claim 2, page 4, line 34, delete phrase "said implementation";
page 5, line 4, insert --- said N-scale --- prior to "MS-CDMA";
- Claim 3, line 17, replace "OWDMA" with --- orthogonal Wavelet division multiple access (OWDMA) ---
page 6, line 11, insert --- and --- between "encoding" and "spreading";
page 6, line 17, insert --- and --- between "encoding" and "spreading";
page 6, line 22, delete phrase -- MS-CDMA, OWDMA, and OFDMA --
replace with ---MS-CDMA OWDMA, and MS-CDMA OFDMA ---page 6,
line 24, insert --- using --- before phrase "filters".

Allowable Subject Matter

4. The following is an examiner's statement of reasons for allowance:

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The prior art of the record fails to teach alone or in combination: A method for implementation of multi-resolution complex Wavelet waveforms in the Fourier domain, and orthogonal Wavelet division multiple access (OWDMA) filter banks, said method comprising: deriving a single multi-resolution Wavelet implementation using design coordinates in the frequency domain to provide multi-resolution property for Wavelets; changing said Wavelet to a complex Wavelet in the Fourier Frequency domain by incorporating a frequency translation as a Wavelet parameter in addition to existing scale (dilation) and translation (shift) parameters; deriving said complex Wavelet with flexibility to meet filter design parameters; constructing OWDMA filters and filter banks implementing said complex Wavelet waveforms, using said complex Wavelet to generate a multi-resolution mother Wavelet at dc using design coordinates in the frequency domain which enable the generation of a desired multi-resolution complex Wavelet using appropriate scale, frequency and translation changes to the mother Wavelet, as recited in claim 1, and in combination with other steps of the claim.

Claim 1 is allowed.

The prior art of the record fails to teach alone or in combination: A method for implementation of multi-scale complex code division multiple access (MS-CDMA) encoding and decoding over multiple scales where each scale corresponds to an independent communications parameter, said method comprising: constructing a complex orthogonal 2-scale MS-CDMA code matrix as a Kronecker product (tensor product) of a subband complex orthogonal MS-CDMA code matrix for scale "0"

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encoding and spreading and a wideband complex orthogonal MS-CDMA code matrix for scale "1" encoding and spreading; constructing a complex orthogonal N-scale MS-CDMA code matrix as a Kronecker product of orthogonal complex MS-CDMA code matrixes for each of the MS-CDMA scales "0", "i", ..., "N-1", with each scale assigned to an independent communications parameter, with each scale performing encoding and spreading of the users; constructing an algebraic field factorization and scaling to convert a CDMA code matrix to a 2-scale CDMA code matrix by generating a CDMA code with a code length equal to a product of a number of chips for a first scale "0" CDMA encoding having first code and chip indices used to encode data symbols within each subband, and a number of chips for .. a second scale "i" CDMA encoding having second code and chip indices used to encode data symbols over the entire set of subbands, forming a 2-scale CDMA code by assigning code and chip 20 indices such that the 2-scale CDMA code and chip indices are the algebraic addition of the first scale "0" code and chip indices plus scaled second scale "i" code and chip indices, wherein said scaled indices are generated using a scale factor that comprises the number of indices in the first scale CDMA code, wherein the steps of generating and forming further include encoding data symbols with the 2-scale CDMA code to generate encoded chips, assigning each of the encoded chips to a subband in accordance with the second scale "i" CDMA code indices, assigning each encoded chip to a chip position within its assigned subband in accordance with the first scale "0" CDMA code indices and generalizing to scales "0", "i", .., "N-1" for an N-scale MS-CDMA code matrix with each scale assigned to an independent communications

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parameter, which each scale performing encoding and spreading of the users, as recited in claim 2 and in combination with other steps of the claim.

Claim 2 is allowed.

The prior art of the record fails to teach alone or in combination: A method for implementing MS-CDMA orthogonal frequency division multiple access (OFDMA) communications, and for implementing MS-CDMA orthogonal wavelet division multiple access (OWDMA) communications, said method comprising: constructing a MS-CDMA code matrix with a Kronecker product for encoding and spreading at each of the scales, with each scale assigned to an independent communications parameter, with each scale performing encoding and spreading of the users, and with one or more scales assigned to OFDMA or OWDMA; constructing a complex orthogonal multi-scale MS-CDMA code matrix for encoding and spreading at each of the scales with a scaled algebraic field, with each scale assigned to an independent communications parameter, with each scale performing encoding and spreading of the users, and with one or more scales assigned to OFDMA or OWDMA; encoding and decoding MS-CDMA OFDMA and MS-CDMA OWDMA with fast algorithms, and implementing said MS-CDMA OFDMA and MS-CDMA OWDMA using filters in a communications transmitter and in a communications receiver for a communications link, as recited in claim 3 and in combination with other steps of the claim.

Claim 3 is allowed.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hajj et al. (U.S. 6,064,768)

Yeap et al. (U.S. 6,456,657)

Kjeldsen et al. (U.S. 7,206,359)

Shattil (U.S. 7,430,257)

Michael et al. (U.S. 7,440,505)

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SOPHIA VLAHOS whose telephone number is (571)272-5507. The examiner can normally be reached on MTWRF 8:30-17:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 571 272 3021. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SOPHIA VLAHOS/
Examiner, Art Unit 2611
4/24/2009

**/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611**